service@intellimeter.on.ca
intellimeter.on.ca

M3 8-16-24 Centres

– Installation & Operation Manual –



M3-8



M3-16



M3-24

1125 Squires Beach Road, Pickering, Ontario L1W 3T9
Phone: 905-839-9199 Fax: 905-839-9198
Revision 5.0 2013-06-24

INDEX

Part One

1. Measurement Canada Requirements

Measurement Canada
Notice to all Electrical Contractors and Owners

(Applies to milli-Amp type CT’s only)

This is to inform the electrical contractors who are installing any static type metering system that Current Transformers (CT’s) are assigned to a specific meter and are required to stay with that meter.

Any CT’s that are not installed on the meter assigned and sealed with will void the meters seal and be considered a non-legal billing meter.

On the side of the CT’s, the serial number of the meter and the potential line is indicated as a guide for the contractor.

FOLLOW THE INSTALLATION DRAWINGS!

Match the CT’s with the meter, and install them on the correct line to the correct phase.
If there are any differences with the drawings compared to your distribution panel,

CALL US IMMEDIATELY!

CAUTION

Phasing and CT installation are very important. If the metering system is not installed according to the installation drawings, the system will not work and any cost in correcting the installation by Intellimeter will be charged back to the installer / developer.

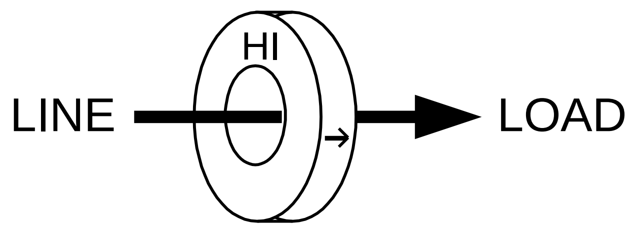
Part Two

2. Metering Rules

#1. Current Transformers (CT's) are directional.
#2. Voltage references must be in phase with the load being metered and from the same source.
#3. CT's (milli-Amp) are certified to an assigned meter and to the meters assigned phase.

Rule #1:

If the CT's are mounted in the opposite direction, the polarity of the CT will be opposite.
The arrow on the CT's indicates the direction from LINE to LOAD.



Similarly the **"H1"** is on the LINE SIDE.

All Intellimeter milliamp current transformers (200:0.1A (2000:1) and 400:0.1A (4000:1)) have self-shorting protection built into the device. They can safely be open circuited while under load.

All 5 Amp (X00: 5A) Type Instrument Transformers Do Not Have This Protection And Are Required To Be Shorted Together While Under Load At All Times.

Rule #2:

Check to verify that the voltage potential used, as a reference voltage, is the same phasing as the loads being metered. ABC is ABC not CBA. The reference voltage must come from the same source. Voltage reference from another transformer is incorrect and causes inaccurate readings.

Connect the voltage reference to the meters disconnect or terminals making sure it is the same phase sequence.

Usually:

Line 1 = Red or 'A' phase
Line 2 = Black or 'B' phase
Line 3 = Blue or 'C' phase
Neutral = White

Rule #3: ***(Intellimeter milliamp current transformers 200:0.1A and 400:0.1A only)***

When the metering system was tested at the factory, the CT's were assigned to a meter and to a specific element of that meter. Under Measurement Canada regulation for electronic static sub-metering, the CT's must be installed and used only with the meter and element that it was certified with.
We have identified each CT so it can be easily installed following the installation drawing that was designed for that particular distribution.
Follow the Installation Drawing! If there is a discrepancy with the drawing in comparison to your distribution panel, call us for assistance.

For all 5Amp type Instrument Transformers, make sure you identify the phase that it was installed on for proper connection at the meter terminal block.

PLEASE CALL IF ANYTHING IS NOT CLEAR. IT IS DIFFICULT TO CORRECT ERRORS ONCE INSTALLATION HAS BEEN COMPLETED!
Technical Assistance: 905-839-9199

Part Three

3. Installation Instructions

These installation instructions are generic for both types of multi-customer sub-metering systems. Again, call before you install if you require additional information on this process. If any of these steps are incorrect, call for assistance.

1. Confirm the drawings that were sent with the metering system are accurate. Verify the type of panel and that the distribution is the same. It is important that all assigned breaker phasing is correct.
2. Assign the proper panel to the identified distribution.
3. Verify the number of loads is the same as the number of meters.
4. Verify the type of system is the same as the meters supplied, (Ex. 120/208V, 100A or 200A, 3 phase 4 wire, single phase 3 wire network system, etc).
5. Mount the panel as indicated by the drawing. Call to inquire if a different mounting configuration would work better.
6. Refer to the drawings to sort out the CT's to be installed on the load feeders.
7. One feeder at a time, install the CT's so the arrow is pointing towards the load. Confirm on the drawing, the installed CT corresponds to the correct phase of the suite. Continue until all CT's are installed.

8. Supply a voltage reference from the distribution panel. Depending on the configuration, minimum is a 15A breaker and the number of phases should match what is required on the drawing.
9. If the system is automated, a CAT 5, 4 pair #24 (Network cable) is required to be pulled from one metering panel to the next until it reaches the communication cabinet that is usually mounted in the communication room or main electrical room. Refer to single line drawing.
10. **Attached is a checklist that is to be completed, verified and faxed back to Intellimeter before commissioning is scheduled.**

NOTE: The electrical contractor will provide an electrician for the duration of the commissioning for inspection and for any modification re-work required. Intellimeter is not liable to work on the electrical distribution and will only be terminating the communication lines. All deficiencies will be recorded and sent to the electrical contractor for correction before returning to site.

Part Four

4. Service Types

- Single Phase (120/240)
  Line 1 = CT1
  Line 2 = CT2

- Network Two Phase Three Wire (120/208) - (3 sets) Typical Colour Code
  Line 1 = CT1 = A phase = Red
  Line 2 = CT2 = B phase = Black
  &
  Line 1 = CT1 = C phase = Blue
  Line 2 = CT2 = A phase = Red
  &
  Line 1 = CT1 = B phase = Black
  Line 2 = CT2 = C phase = Blue

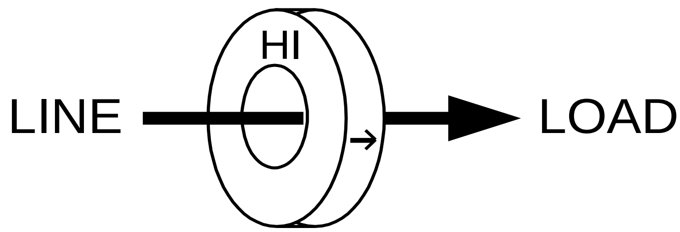
***** If the load is on B & C phase, Line 1 (CT1) is on B phase and Line 2 (CT2) is on C phase.
This staggering of phasing is to match the typical three-phase four-wire distribution panel for 2 phase loads.

Three Phase Meter Typical (120/208, 277/480, 347/600) Colour Code
Line 1 = CT1 = A phase = Red / Orange
Line 2 = CT2 = B phase = Black / Brown
Line 3 = CT3 = C phase = Blue / Yellow

Part Five

5. CT Wiring and Lengths

Current Transformers (CT's) are directional (⟶). An arrow points to the load.
"H1" also indicates Line Side.



Typical: Install CT1 on Line 1 (Red), CT2 on Line2 (Black), and CT3 on Line3 (Blue).
Refer to "Service Types" above for your system.

External Current Transformers (CT's) Twisted Pair #18-14 stranded colour code

#1	**Intellimeter CT's 200A (ICI30CT21)**	**White (+) Black (-)**
#2	**Intellimeter CT's 400A (ICI30CT41)**	**Yellow / Black trace (+) Yellow (-)**
#3	**Instrument Transformers (CT's) (All X00: 5A Type)**	**White (+) = X1 Black (-) = X2**

The maximum length the CT leads can be extended is 400 feet for #1 & #2 and 50 feet only for #3. 1 twisted pair wire only for each CT.
Intellimeter CT's: <50ft = #18 minimum
>50 to <150ft = #16 minimum
>150 to 250ft = #14 minimum
>250 to 400ft = #12 minimum
Instrument CT's: #14 minimum

Identify the polarity and the phase the CT is installed on for proper termination.
<u>Always identify all wires</u>.
<u>Refer to installation drawings and terminal labels for polarity and connection.</u>

Part Six

6. M3 - Meter Field Installation, Testing, and Troubleshooting Procedure

The M3 Centre is a solid-state multi-customer metering system that comes in three configurations: M3-8, M3-16 & M3-24.

The M3-8 model has the metering capability of up-to 8 meters and one PT2000 twin unit pulse recorders with 8 spare input zones.

The M3-16 model has the metering capability of up-to 16 meters and one PT2000 twin unit pulse recorders with no spare zones.

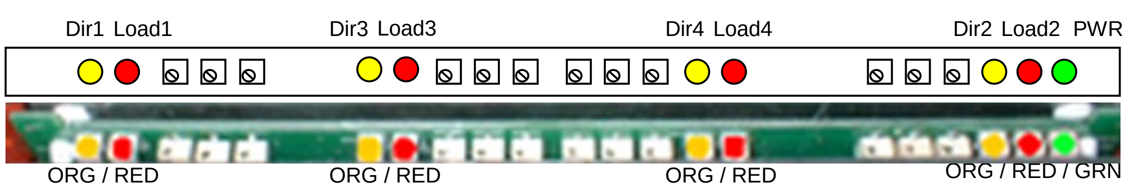
The M3-24 has the metering capability of up to 24 meters and two PT2000 twin unit pulse recorders with 8 spare input zones.

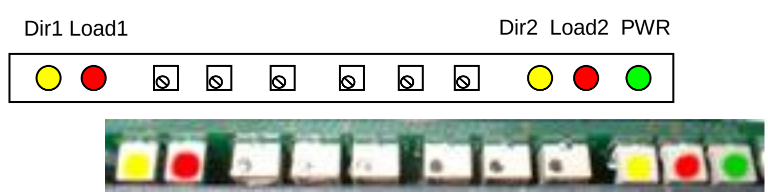
These models are modular and can be interconnected along with the TX2005 meters to meter any number of loads, any one location. Each individual customer has its register mounted to the meter circuit board: Quad has four electro mechanical registers and the twin has two electromechanical registers. Each individual meter has two LEDs and a form "A" pulse output mapped to a given pin location for recording metered data.

Installation: Refer to above.

Part Seven

7. LED Indicators:





(Continued on next page)

Dir LEDs: When OFF, it indicates CT is installed correctly.
When ON (Orange), CT is installed backwards, majority of load is in the negative direction, or phasing is incorrect. Re-verify the installation

LOAD LEDs: Under load, this LED (Red) will pulse. The more load, the faster the pulsing. Refer to attach label for pulse rate (Ks).

PWR: This LED (Green) indicates power is ON.

Accuracy test:

(Referring to the LOAD LED pulse)
The M3 Centre Meter has a LOAD LED (Red) that will allow the meter to register a pulse at attached label for pulse rate (Ks). This will enable you to determine the accuracy of the meter with a radian standard or to mathematically determine the time between pulses for a given load.

Voltage=Phase to Neutral
Amperage=SUM of all currents
1 / ((Voltage x Amperage) ÷ Ks ÷ 3600) = seconds per pulse

This is the time in seconds between pulses in test mode.

Troubleshooting:

"LOAD" LED NOT ON or PULSING	- No load on service - CT's installed incorrectly - Phasing out of sequence CT's and phasing should be matched: CT1 on Line1, CT2 on Line2, and CT3 on Line3	- Apply some load - Refer to above wiring - Correct the install
"DIR" LED ON	- Indicates the majority of the load is in the negative direction - CT is installed backwards, phasing is not correct	- Correct the CT installation - Refer to above installation directions
"POWER" LED NOT ON	- Power not connected or not ON, Line1 and Neutral required to power the meter.	- Verify the voltage reference is energised

Part Eight

8. Communication Cable:

Refer to the enclosed sheet for communication cable pathway, connection and termination configuration between all automation.

M3-Series typically uses PT2000 only. Refer to the PT2000 connection drawing for termination and specifications.

For any additional installation and troubleshooting questions, please call and ask for technical help.

(905) 839-9199 – Technical Support.

Part Nine

9. Pre Site Visit Check List

	Description of Work	Yes / No	Tech:
1	All loads have been identified and confirmed at the distribution panels. **"Suite to Breaker Verification"**		
2	The installation drawings are accurate.		
3	All distribution/metering equipment installed.		
4	All suite feeders has been pulled and connected to their designated breaker through the CT's provided for that position.		
5	Main feed are pulled, connected, and panel energised.		
6	All suites or loads have been documented on the installation drawings.		
7	All communication cables (if applicable) are pulled accordingly to the single line drawing. (CAT5 cable, 4 pair, #24)		
8	In each metering cabinet, the communication cable is identified and has enough length for proper termination.		
9	The PTLS communication cabinet is mounted in designated area and a 120VAC, 15A circuit is assigned to it.		
10	The PTLS is limited to a maximum ambient temperature of 32 degrees Celsius / 90 degrees Fahrenheit with a maximum relative humidity of 68%. Is the PTLS located in an area with these requirements?		
11	A communication cable (CAT5) from the communication cabinet to the phone board or network hub is supplied for remote communication.		
12	The metering panels are all energised and working.		
13	There are no ORANGE lights indicated on any of the metering panels (Page 8).		

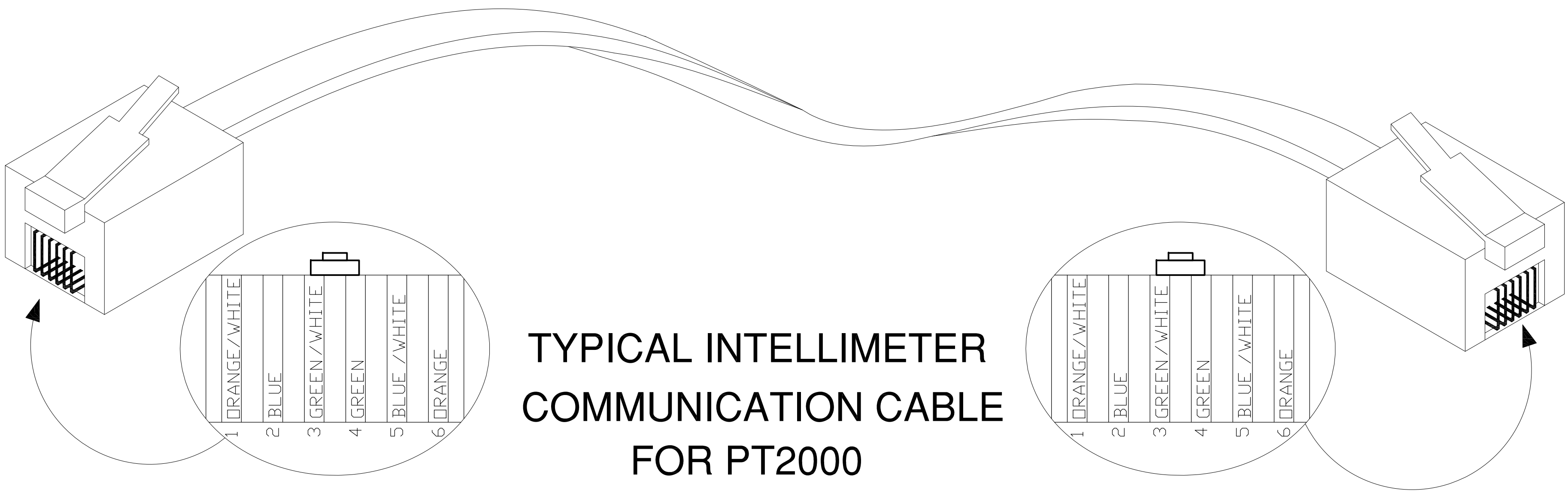
Job Name:	Job #:	Date:

Company:		Office Number:	
Forman:		Site Number:	
Signature:			
Date Requesting for Site Visit:			

Intellimeter Canada Service Department: Phone: 905-839-9199, Fax: 905-839-9198

Intellimeter Canada Inc.
Communication Terminations

CROSS OVER CABLE



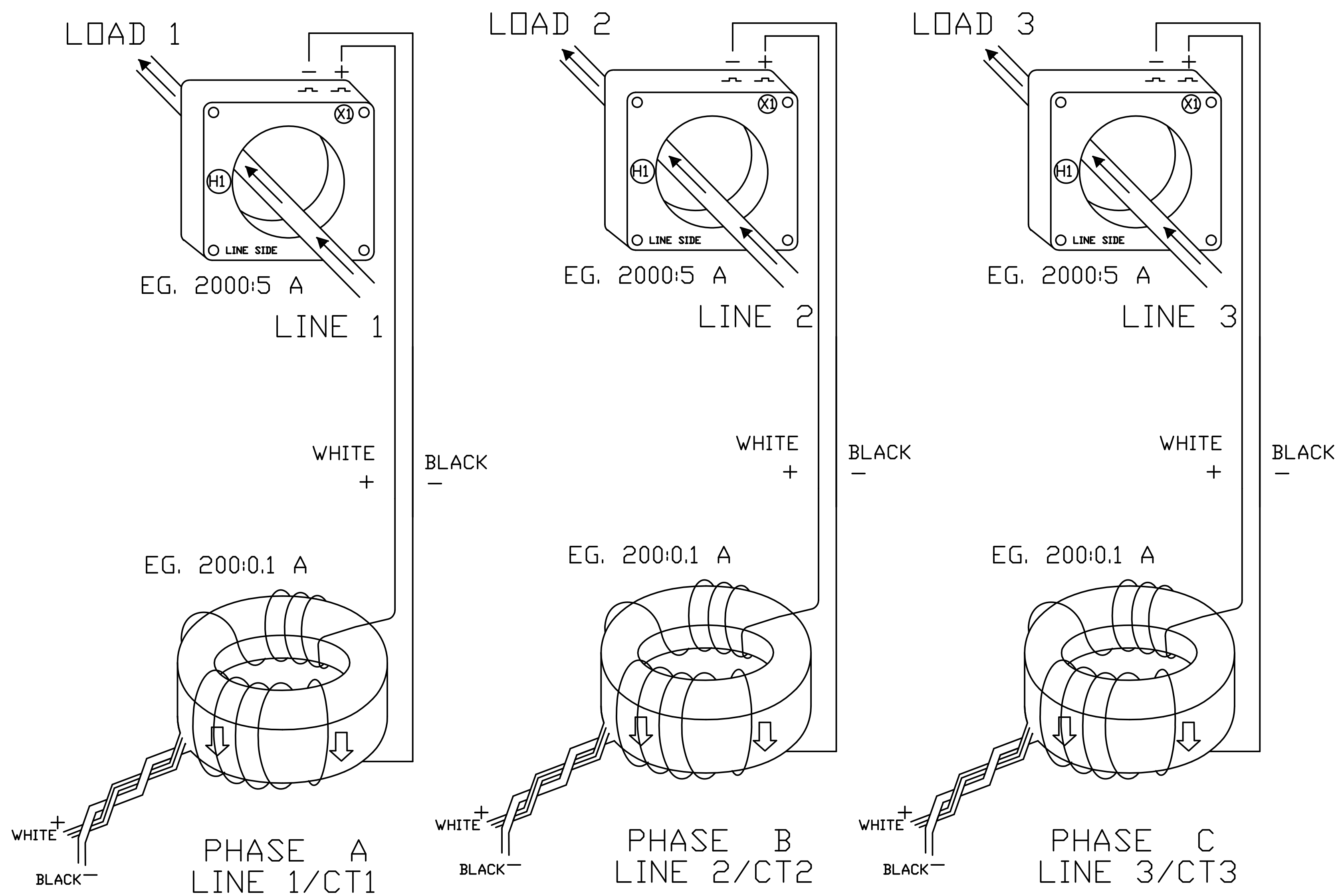
TYPICAL INTELLIMETER
COMMUNICATION CABLE
FOR PT2000

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Innovative Metering Solutions

1125 Squires Beach Road
Pickering, Ontario L1W 3T9
Phone: (905) 839-9199
Fax: (905) 839-9198
intellimeter.on.ca

Project Name:	
Distributor:	
Engineer:	
P.O.# XXX	
Contractor:	
Date:	Rev.
Project #:	
Drawing #:	
Drawn: H.P.	
Checked: H.P.	
Drawing: 20 Turn CT's	

CT UP-GRADE TO INTELLIMETER METERING.



WIRING FOR SCALING X00:5 AMP CT's
TO 20 TURN 200:0.1 AMP CT's

N.T.S.

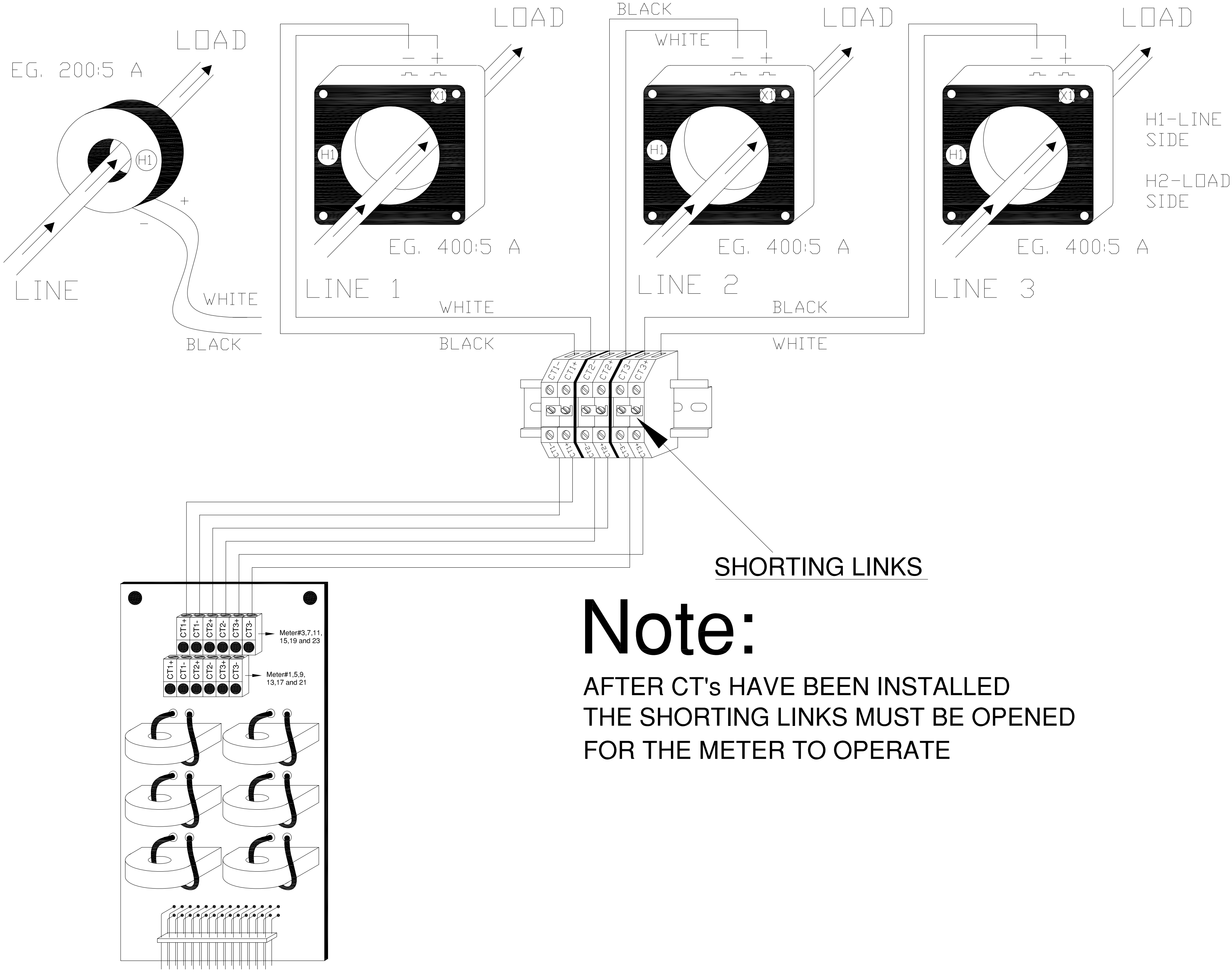
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Innovative Metering Solutions

1125 Squires Beach Road
Pickering, Ontario L1W 3T9
Phone: (905) 839-9199
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Drawing #:	
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Checked: H.P.	
Drawing: 20 Turn CT's	

WIRING FOR SCALING X00:5 AMP CT's TO 10 AMP CT BOARD

OR



Note:

AFTER CT's HAVE BEEN INSTALLED
THE SHORTING LINKS MUST BE OPENED
FOR THE METER TO OPERATE

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Innovative Metering Solutions

1125 Squires Beach Road
Pickering, Ontario L1W 3T9
Phone: (905) 839-9199
Fax: (905) 839-9198
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Date:	Rev.

Project #:

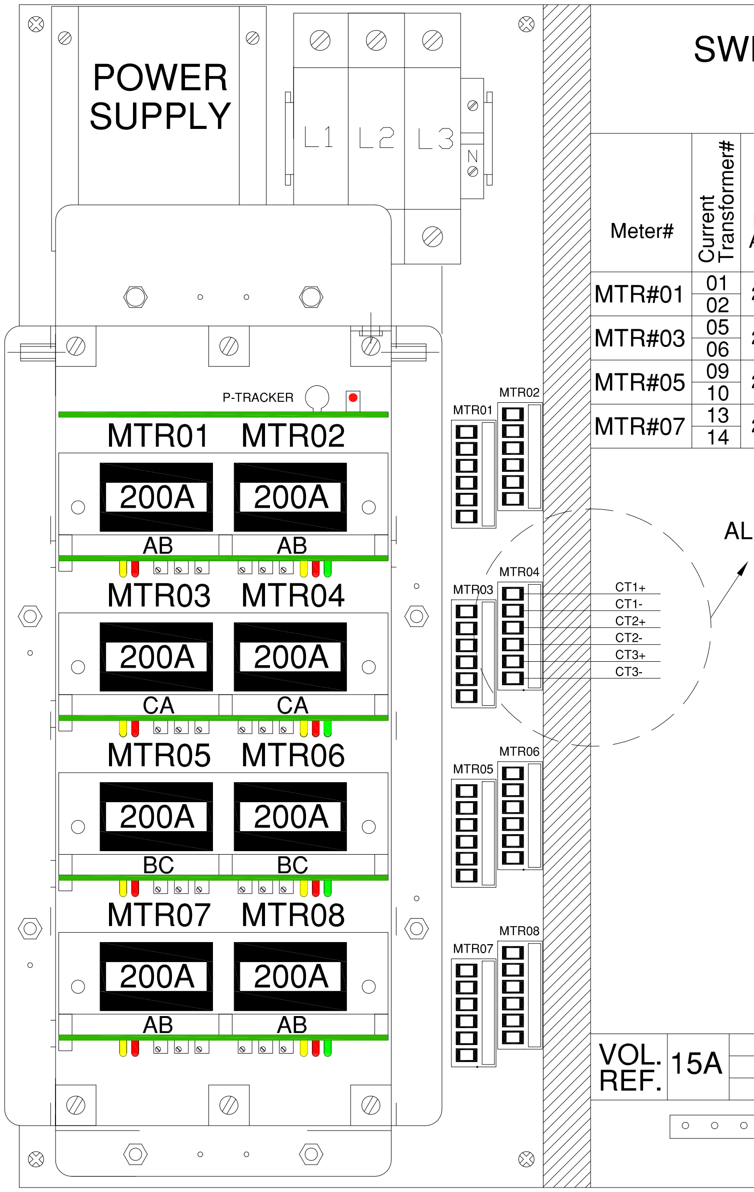
Drawing #:

Drawn:
H.P.

Checked:
H.P.

Drawing:
20 Turn CT's

M3-8 TYPICAL



SWITCH DISTRIBUTION PANEL
120/208V 3Ø,4W

Meter#	Current Transformer#	BRK. AMP.	PHASE	Breaker#		PHASE	PHASE	BRK. AMP.	Current Transformer#	Meter#
MTR#01	01 02	200A	A B	01 03	2-POLE	02 04	A B	200A	03 04	MTR#02
MTR#03	05 06	200A	C A	05 07	2-POLE	06 08	C A	200A	07 08	MTR#04
MTR#05	09 10	200A	B C	09 11	2-POLE	10 12	B C	200A	11 12	MTR#06
MTR#07	13 14	200A	A B	13 15	2-POLE	14 16	A B	200A	15 16	MTR#08

TYPICAL
FOR
ALL CONNECTORS

VOL. REF.	15A		A B C	3-POLE				

NEUTRAL

WARNING: METERING PANEL HAS BEEN PHASED ACCORDINGLY.
DO NOT CHANGE ASSIGNED DISTRIBUTION.

SDP AND EMP DESIGNATION

SUITE NO.		METER NO.	SUITE NO.		METER NO.
	IS METERED BY →	METER#01		IS METERED BY →	METER#02
	IS METERED BY →	METER#03		IS METERED BY →	METER#04
	IS METERED BY →	METER#05		IS METERED BY →	METER#06
	IS METERED BY →	METER#07		IS METERED BY →	METER#08

N.B.: PLEASE COMPLETE THE SHOP DRAWING WITH THE APPROPRIATE SUITE INDENTIFICATION.

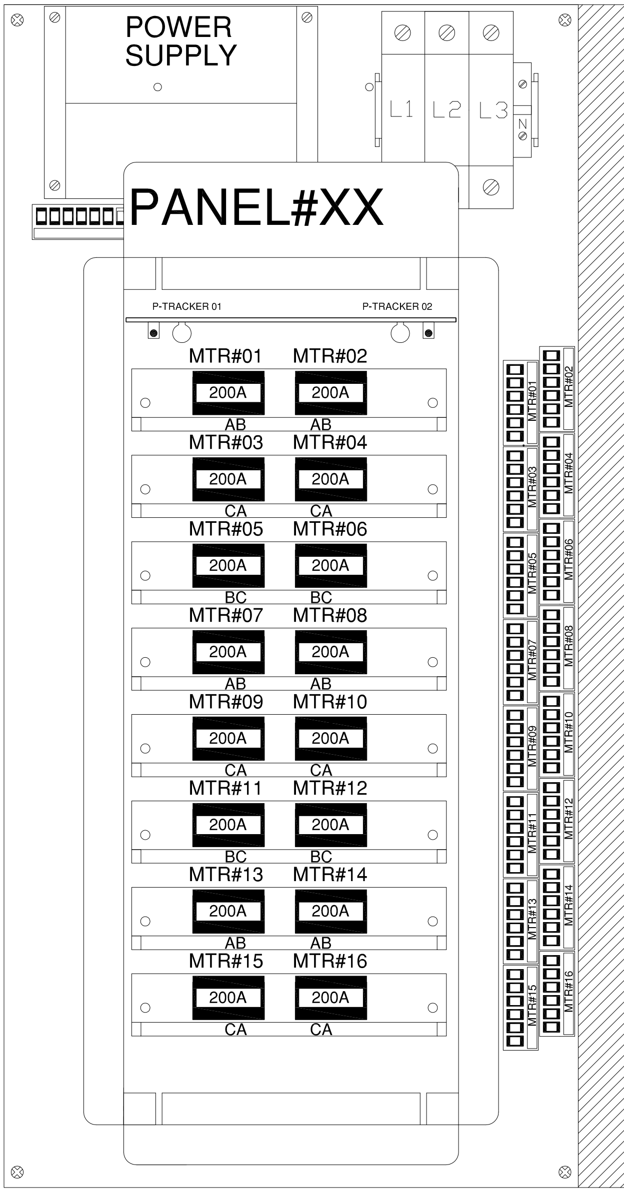
SDP : Switch Distribution Panel EMP: Electronic Metering Panel

CT: Current Transformer

intellimeter CANADA INC.
Innovative Metering Solutions
1125 Squires Beach Road
Pickering,Ontario L1W 3T9
Phone:(905) 839-9199
Fax:(905) 839-9198
intellimeter.on.ca

Project Name:	Distributor:	Engineer:	P.O.#	Date:	Rev.	Project#:	Drawing#:	Drawn:	Checked:	Drawing:
								H.P.		

M3-16 TYPICAL



SWITCH DISTRIBUTION PANEL
120/208 3Ø,4W

MTR#	Current Transformer#	BRK. AMP.	PHASE	Breaker#		Breaker#	PHASE	BRK. AMP.	Current Transformer#	MTR#
MTR#01	01 02	125A	A B	01 03	2-POLE	02 04	A B	100A	03 04	MTR#02
MTR#03	05 06	100A	C A	05 07	2-POLE	06 08	C A	100A	07 08	MTR#04
MTR#05	09 10	100A	B C	09 11	2-POLE	10 12	B C	100A	11 12	MTR#06
MTR#07	13 14	100A	A B	13 15	2-POLE	14 16	A B	100A	15 16	MTR#08
MTR#09	17 18	100A	C A	17 19	2-POLE	18 20	C A	100A	19 20	MTR#10
MTR#11	21 22	100A	B C	21 23	2-POLE	22 24	B C	100A	23 24	MTR#12
MTR#13	25 26	100A	A B	25 27	2-POLE	26 28	A B	100A	27 28	MTR#14
MTR#15	29 30	100A	C A	29 31	2-POLE	30 32	C A	100A	31 32	MTR#16
VOL. REF.	15A		A B C		3-POLE					

NEUTRAL

SDP AND EMP DESIGNATION

SUITE NO.		MTR NO.	SUITE NO.		MTR NO.
	IS METERED BY	MTR#01		IS METERED BY	MTR#02
	IS METERED BY	MTR#03		IS METERED BY	MTR#04
	IS METERED BY	MTR#05		IS METERED BY	MTR#06
	IS METERED BY	MTR#07		IS METERED BY	MTR#08
	IS METERED BY	MTR#09		IS METERED BY	MTR#10
	IS METERED BY	MTR#11		IS METERED BY	MTR#12
	IS METERED BY	MTR#13		IS METERED BY	MTR#14
	IS METERED BY	MTR#15		IS METERED BY	MTR#16

WARNING: MTRING PANEL HAS BEEN PHASED ACCORDINGLY.
DO NOT CHANGE ASSIGNED DISTRIBUTION.

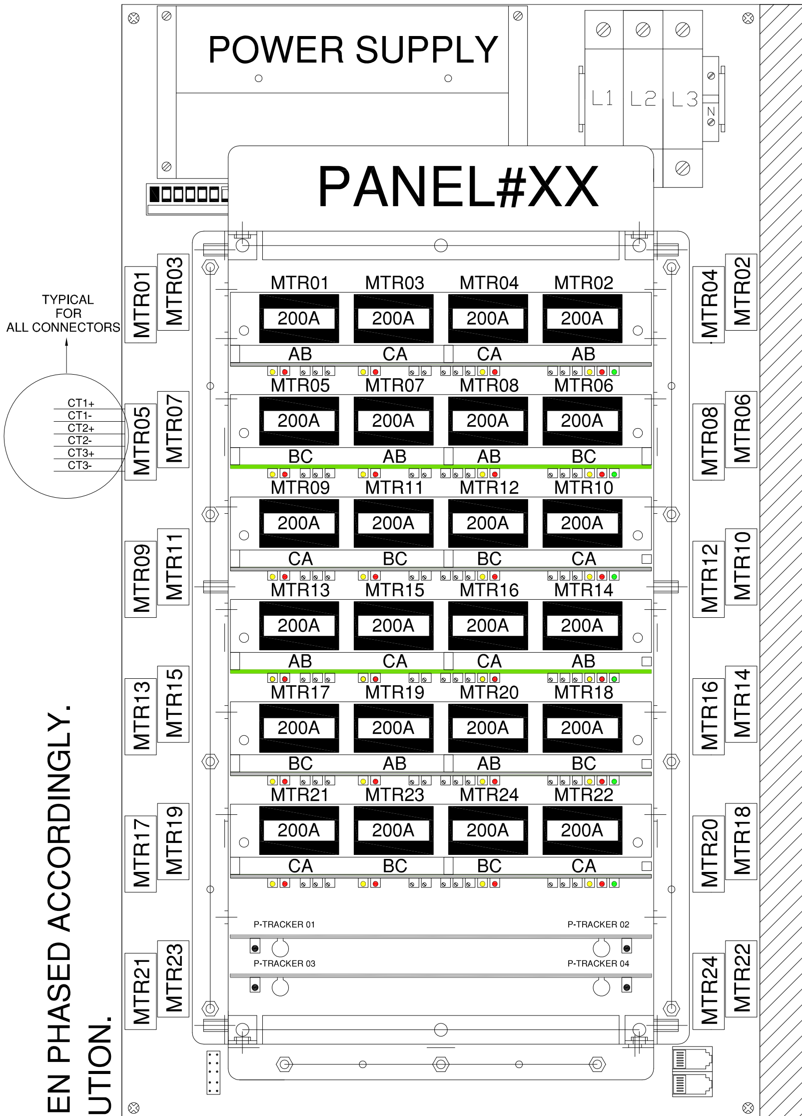
N.B.: PLEASE COMPLETE THE SHOP DRAWING WITH THE APPROPRIATE SUITE INDENTIFICATION.

SDP : Switch Distribution Panel EMP: Electronic MTRing Panel

intellimeter CANADA INC.
Innovative Metering Solutions
1125 Squires Beach Road
Pickering,Ontario L1W 3T9
Phone:(905) 839-9199
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intellimeter.on.ca

Project Name:	Distributor:	Engineer:	P.O.#	Date:	Rev.	Project#:	Drawing#:	Drawn:	Checked:	Drawing:
								H.P.		

M3-24 TYPICAL



WARNING: METERING PANEL HAS BEEN PHASED ACCORDINGLY.
DO NOT CHANGE ASSIGNED DISTRIBUTION.

SWITCH DISTRIBUTION PANEL
120/208 3Ø,4W

SUITE#	Current Transformer#	BRK. AMP.	PHASE	Breaker#		Breaker#	PHASE	BRK. AMP.	Current Transformer#	SUITE#
MTR01	01 02	100A	A B	01 03	2-POLE	02 04	A B	100A	03 04	MTR02
MTR03	05 06	100A	C A	05 07	2-POLE	06 08	C A	100A	07 08	MTR04
MTR05	09 10	100A	B C	09 11	2-POLE	10 12	B C	100A	11 12	MTR06
MTR07	13 14	100A	A B	13 15	2-POLE	14 16	A B	100A	15 16	MTR08
MTR09	17 18	100A	C A	17 19	2-POLE	18 20	C A	100A	19 20	MTR10
MTR11	21 22	100A	B C	21 23	2-POLE	22 24	B C	100A	23 24	MTR12
MTR13	25 26	100A	A B	25 27	2-POLE	26 28	A B	100A	27 28	MTR14
MTR15	29 30	100A	C A	29 31	2-POLE	30 32	C A	100A	31 32	MTR16
MTR17	33 34	100A	B C	33 35	2-POLE	34 36	B C	100A	35 36	MTR18
MTR19	37 38	100A	A B	37 39	2-POLE	38 40	A B	100A	39 40	MTR20
MTR21	41 42	100A	C A	41 43	2-POLE	42 44	C A	100A	43 44	MTR22
MTR23	45 46	100A	B C	45 47	2-POLE	46 48	B C	100A	47 48	MTR24
VOL. REF.	15A		A B C		3-POLE					

NEUTRAL

SDP AND EMP DESIGNATION

SUITE NO.		METER NO.	SUITE NO.		METER NO.
	IS METERED BY →	METER#01		IS METERED BY →	METER#02
	IS METERED BY →	METER#03		IS METERED BY →	METER#04
	IS METERED BY →	METER#05		IS METERED BY →	METER#06
	IS METERED BY →	METER#07		IS METERED BY →	METER#08
	IS METERED BY →	METER#09		IS METERED BY →	METER#10
	IS METERED BY →	METER#11		IS METERED BY →	METER#12
	IS METERED BY →	METER#13		IS METERED BY →	METER#14
	IS METERED BY →	METER#15		IS METERED BY →	METER#16
	IS METERED BY →	METER#17		IS METERED BY →	METER#18
	IS METERED BY →	METER#19		IS METERED BY →	METER#20
	IS METERED BY →	METER#21		IS METERED BY →	METER#22
	IS METERED BY →	METER#23		IS METERED BY →	METER#24

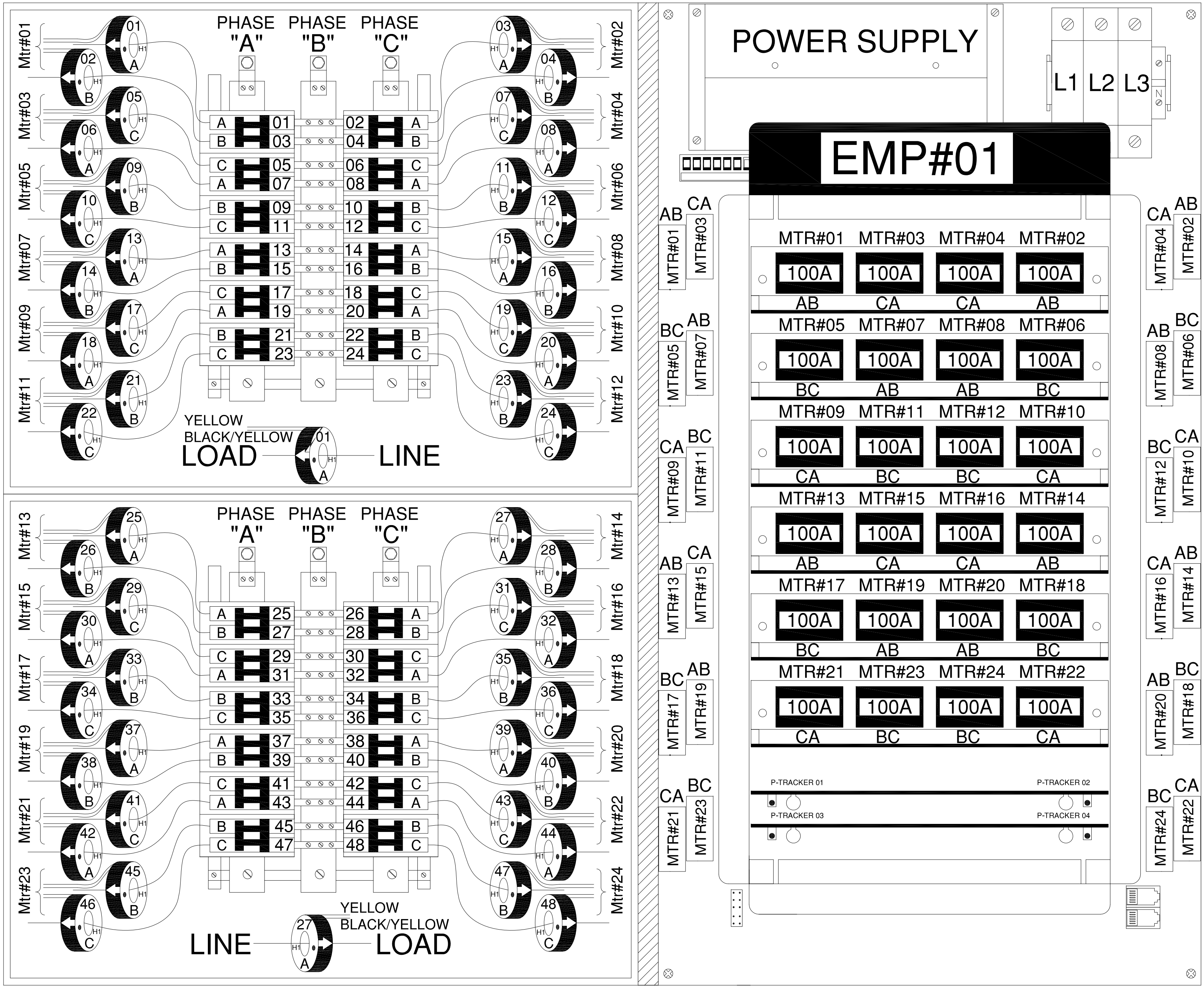
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Pickering,Ontario L1W 3T9
Phone:(905) 839-9199
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intellimeter.on.ca

Project Name:	Distributor:	Engineer:	P.O.#	Date:	Rev.	Project#:	Drawing#:	Drawn:	Checked:	Drawing:
								H.P.		

M24 INSTALLATION DRAWING



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1125 Squires Beach Road
Pickering, Ontario L1W 3T9
Phone: (905) 839-9199
Fax: (905) 839-9198
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Project Name:

Distributor:

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P.O.#

Contractor:

Date:	Rev.

Project #:

Drawing #:

Drawn:
H.P.

Checked:
H.P.

Drawing: